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ABSTRACT

The relationship between interaction with the caregiver and the emergence of play activities during the one-word period was examined. In particular, investigation centered on Vygotsky's views regarding the importance of social interaction as the source of the child's knowledge of the world. To empirically examine the role of the caregiver, observations were made of six children (two children were observed at each of three levels of semantic development within the one-word period). At each of the three levels, the children's performance during interactive play sequences was found to be more advanced than their performance during noninteractive sequences. These results lend support to Vygotsky's contention that cultural activities are first acquired on the interpersonal level and later displayed at the intrapersonal level. (Author/MP)

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The Relationship between Interaction with the Caregiver and the Emergence of Play Activities during the One-word Period

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Running head: Interaction with the Caregiver and the Emergence of Play

Abstract

The relationship between interaction with the caregiver and the emergence of play activities during the one-word period was examined in this research. In particular, Vygotsky's views regarding the importance of social interaction as the source of the child's knowledge of the world were discussed. To empirically examine the role of the caregiver, observations were made of six children, two at each of three levels of semantic development within the one-word period. At each level of semantic development the children's performance during interactive play sequences was more advanced than their performance during noninteractive sequences. These results lend support to Vygotsky's contention that cultural activities are acquired on the interpersonal level first and are displayed at the intrapersonal level later.

The Relationship between Interaction with the Caregiver and the Emergence of Play Activities during the One-word Period

To be competent members in any society children must know the rules and understand the organization of events in order to actively communicate, participate in, and interpret the emergent meaning of interactions. These abilities depend upon shared knowledge of the world (Bates, 1976; Keenan & Klein, 1975). Shared knowledge of the world, of persons, objects, and events is social (Miller, in press; Ochs, 1982; Ochs & Schieffelin, in press). The processes which guide the emergence of that knowledge occur within a dynamic social matrix (Shweder, 1982). The work of children is to acquire that knowledge, 'what everyone knows' (Schutz, 1971), while the work of socializing agents is to facilitate that process. However, relatively little is known about the social interactive aspects of that process.

To investigate the contribution of socializing agents to the development of children, Vygotsky (1978) differentiated the level of actual development from the zone of proximal development. The level of actual development refers to the mental functions the child has already acquired. The zone of proximal development is the area between what the child can do alone and what the child can accomplish when guided by or in collaboration with a more competent person. Functions in the process of maturation first appear in the zone of proximal development and only later on the level of actual development. The zone of proximal development that is created in interactive play is a major setting for acquisition of cultural knowledge and the shift to abstract thought. Therefore, studying the role of the other interactant in the zone of proximal development appears to be crucial to understanding the child's transition to competent member and from elementary to higher processes.

Wertsch, McNamee, McLane, and Budwig (1980) have demonstrated that initially in a problem solving situation the caregiver guides or 'other-regulates' the child by fitting the child's actions into the caregiver's interpretation of the ongoing activity. Later, the child internalizes the structure and is able to 'self-regulate' her/his own doings. Their work strongly supports Vygotsky's contention that all human abilities first appear interactionally and only later are produced by the individual alone. Results from studies of play routines (Bruner & Sherwood, 1976), everyday activities such as give-and-take (Bruner, 1977), problem solving tasks (Wood & Middleton, 1975), instruction in memory skills (Gardner & Rogoff, 1982), conversational skills (Snow, 1977), and the transition from sensorimotor to linguistic comprehension of communication (Zukow, 1982; Zukow et al., 1982) support Wertsch's view that caregivers structure interactions by building on what the child already knows and provides a framework within which children can interpret ongoing events. However, in the domain of play, Fein (1981) and Rubin, Fein, and Vandenberg (in press) have pointed out that the role of the caregiver is indirect or, at best, unresolved due to a lack of studies addressing the importance of caregiver input. Further, since the situations in the research which supports Vygotsky are by definition interactions, they could not be examined to compare children's performance in the level of actual development to their performance in the zone of proximal development.

Although Vygotsky (1978) considered play to be the matrix within which cultural knowledge emerges, he did not consider play to be symbolic in children under three years of age. However, in most studies play activities are ranked in terms of the level of symbolic conduct displayed (see Rubin et al., in press, for a review). The play activities of young children have been interpreted as if the activities displayed serve the same symbolic function for

children as for adults. Take an action that is often interpreted as symbolic play, 'pretending' to feed imaginary food to a doll (Wolf & Gardner, 1979). Investigators have assumed that the child treats the doll as if the doll stands for an animate being (Bates, Benigni, Bretherton, Camioni, & Volterra, 1979). Similarly, other researchers have assumed that the child has imaginary food in mind when placing an empty spoon near the doll's mouth (Fein, 1979). However, the children may be merely going through the motions of an activity without comprehension of the social meaning of those movements (Zukow, in press). Thus, in order to attribute to the child that the act engaged in is feeding one must accept unproven assumptions about the symbolic meaning of the action for the child. The child may be simply displaying cultural knowledge of conventional miniature object use (Dunn & Wooding, 1977; El'Konin, 1971). Since what has been defined as play are the activities in which children display their culturally organized knowledge of the world and its objects (Veneziano, 1981; Zukow, in press), in this study play will be considered in terms of the degree of cultural knowledge displayed rather than in terms of the level of symbolic conduct.

This study was designed to clarify the contribution of the caregiver to the child's emerging play activities during the one-word period. First, to determine whether children's performance during the one-word period was enhanced by caregiver input, their performance in noninteractive play sequences during which the children were not guided by their caregivers (level of actual development) was compared to their performance in interactive sequences during which the children were guided by their caregivers (zone of proximal development). Second, to reveal developmental differences, the performance of the children at three levels of semantic development (Greenfield & Smith, 1976) was analyzed. These levels have proven to be an ef-

fective means of revealing differences in caregiver practices as children develop (Zukow, 1982; Zukow, 1983; Zukow et al., 1982). A gradual shift from "other-regulation" to "self-regulation" was found by comparing and contrasting interactions at these three levels. Third, a microanalysis of interaction (Zukow, 1980; Zukow et al., 1982) was undertaken to formulate just what caregiver-child pairs do during play. Careful descriptive studies can fulfill the important function of disclosing the nature of phenomena which theories inadequately grounded in everyday life may overlook. This work was accomplished via the viewing and reviewing of videotapes in conjunction with transcripts of the videotaped interactions. The advantage of this procedure is that there is a minimum of data reduction. The goal is to display the overall organizational integrity of sequences of behavior through the detail which constitutes it. Due to the time consuming nature of this analysis, an intensive analysis of a limited number of subjects was conducted rather than a superficial analysis of a large number of subjects.

Method

Subjects. The children whose interactions were analyzed came from middle-class, generally college educated, white families. On the basis of diary evidence, six children were selected for this study who were at three levels of semantic development within the one-word period (Greenfield & Smith, 1976; Zukow et al., 1982). The productive use of the following semantic functions served as criteria for classification within the three levels. Level I - performative, indicative object, and volitional object; Level II - agent, action/state, object; Level III - object associated with another object, animate being associated with another object, location, instrument and patient or dative (experiencing animate being).

At Level I children were restricted to the simplest communicative acts characterized by minimal propositional content. An example of a semantic function at Level I is indicative object, in which the child verbally indicates the thing he or she is pointing at. Pointing indicates the child's relation to the object pointed at. In this case, the only propositional context (linguistically expressed) is the object pointed at. At Level II children were also able to communicate semantic functions implying simple predicate-argument relations. In this case, the child may express, for example, the action, saying down, coming down the stairs. The self is implied as agent but is not expressed. Finally, at Level III children were also able to communicate more complex predicate-argument relations implying two arguments. For example, when expressing location, the child might say chair while making a doll sit in a chair.

Only spontaneous non-imitative utterances from the diaries were evaluated as exemplars of particular semantic functions. Three instances of distinct lexical items within one semantic function and/or lexical items representing (3) different semantic functions within a particular level served as evidence of productive use. For instance, if Sandy had been observed to say X while pointing at X (X: ball, clock, doll), she was categorized as having displayed abilities characteristic of Level I. At Level I, one instance of each of three semantic functions was equally acceptable, i.e., saying bye-bye while waving bye-bye (performative), pointing at a cookie while saying cookie (indicative object), and whining and reaching for milk while saying milk (volitional object).

All diary entries were classified by two judges as spontaneous or imitated. Interjudge agreement was 97.7% (43/44) for classifying utterances as spontaneous or imitated. The spontaneous utterances were judged to be

classifiable or to be ambiguous due to insufficient information. The classifiable utterances counted as instances of particular semantic functions according to definitions in Greenfield and Smith (1976) for classifying utterances as Level I, II, or III. The overall agreement was 81%.

The children were first classified as follows: Level I - Jeremy (9 months) and Sandy (13 months); Level II - Alice (19 months), Jim (15 months), and Lisa (17 months); Level III - Jeri (22 months). Jeremy and Jim were first born sons; Sandy, Alice, Lisa, and Jeri were second born daughters. The children were reclassified 4 to 6 weeks later in the following manner: Level I - Jeremy and Sandy; Level II - Alice and Jim; and Level III - Lisa and Jeri. Note that semantic level is not directly related to age, e.g., Lisa, although younger than Alice, advanced to Level III while Alice remained at Level II. However, the emergence of levels of semantic functions appears to follow an ordered sequence (Greenfield & Smith, 1976).

Procedure. Since shared knowledge has been defined here as social, it follows that the study of the processes by which children acquire such knowledge would be best served by examining children in the context in which they become competent members. These situations are the most mundane, naturally occurring events of everyday life at home, at play, at school. Two one-half hour naturalistic videotapes were taken in the home of each caregiver-child pair as part of a larger developmental study of communicative competence. Caregivers were instructed to select common everyday interactive settings in which the most communication could be expected. These situations were defined by the caregivers as mealtime, play, and diaper changing. Approximately 3/4 of the time the caregiver-child pairs were engaged in play.

Transcription. A rendering of the activities, visual attention, and linguistic behavior of both caregiver and child was made. (For a full description of the transcription system and the rationale for this methodology, see Zukow, 1982; Zukow et al., 1982.) Separate descriptions of the activities recorded for each coparticipant included potentially communicative gross body movement (leaning toward, pulling away), activities (reaching, grasping, throwing), conventional communicative gestures (headshaking, shrugs), facial expressions (smiles, grimaces), and body orientation. Visual attention in terms of eye gaze vis-à-vis the picture plane (television monitor screen) was rendered on subsequent viewings. Separate audio transcriptions were made. The caregiver's speech was rendered for the most part according to conventions established by Sacks, Schegloff and Jefferson (1974) while a phonetic transcription was made of the child (Ladefoged, 1975). Finally, each observation and the beginning and the end of each utterance were recorded from the time code that had been dubbed onto the videotape in minutes, seconds, tenths, and hundredths of a second. The audio transcription and the observations of the caregiver and child's behaviors were sequentially integrated by computer on the basis of the time code into a scriptlike format.

A transcript of a play sequence (Figure 1) is presented below as representative of this technique. Following the transcript is a descriptive summary. A brief but incomplete description of the transcription conventions is included to aid in reading this example. The caregiver's utterances are in standard English orthography. The child's utterances are written phonetically. The length of the utterance is depicted to the right of the time code by a column of vertical obliques. The top of the bar is the time at which the utterance was initiated; the bottom of the bar is the time at which the utterance terminated. Underlining indicates increased loudness. Punctuation

marks (, ! ?) are used for intonation, not as grammatical symbols. The end of an utterance is represented by an oblique (/). Uncertain transcriptions are enclosed in single parentheses, (). Colons (::) indicate syllable lengthening. The direction of eye gaze is represented vis-a-vis the TV monitor screen horizontally as follows: >, facing right; <, facing left; Δ, facing away from camera; ∇, facing toward the camera. Eye gaze direction on a vertical axis is represented in this way: ↑, up; ↓, down. Body orientation, in the left-hand column of the transcript, is schematized as follows: ⊂, body facing to the right; ⊃, body facing to the left, and so on.

Insert Figure 1 about here

During this interactive play sequence a 19-month-old child, Alice, and her mother are seated on the floor in the living room. Alice's mother makes an offer to Alice that she comb a doll's hair at 2:23:23. At 2:24:90 Alice smiles. Her mother combs the doll' hair at 2:26:12. Alice steps toward her mother at 2:27:93 with her arm extended. Her mother combs Alice's hair at 2:28:70. Alice drops the hat she has been holding and takes the doll from her mother at 2:29:93, accepts the proferred comb at 2:31:23 and combs the doll's hair at 2:32:30.

Microanalysis of data. Although Vygotsky believed that cultural knowledge is transmitted and emerges through social interaction, he did not develop a specific methodology to analyze these interactive processes. Ethnomethodologists explicitly study the methods or practices of members of (cultural) groups engaged in everyday activities. Therefore, a microanalysis of interaction informed by ethnomethodology (Garfinkel & Sacks, 1970; Zukow, 1980; Zukow et al., 1982) was undertaken to formulate just what caregiver-child

taken to formulate just what caregiver-child pairs do during play. This method consists of coming to an understanding of how members of particular groups delicately negotiate the emergent meaning of interactions through detailed analysis of ongoing activities (Garfinkel, 1967, 1972). The object of analysis is close description and assessment of the identifying features and details of interaction. In the present research this work was done via the viewing and reviewing of videotapes. A competent analysis is dependent on the analyst being a competent member of the 'culture'. A competent member can recognize and engage in common everyday activities. Since the emergent meanings of interactions are displayed by the coparticipants to each other, they are available to the analyst as well (Gardner & Rogoff, 1982; McDermott, Gospodinoff, & Aron, 1978; Mehan & Wood, 1975). An interactant's current action is taken to be the interactant's analysis of the situation up to that point (see Sacks & Schegloff, 1972, for a discussion of displayed interpretation in interaction). Thus, the interpretations of ongoing events that the participants displayed in their action served as the basis for categorizing activities.

The interactants' analyses was reflected in the criteria for assessing play; that is, the interactant's response must be relevant to the play sequence initiated by the other coparticipant; the initiator of interaction must take the response to be relevant, and vice versa. Take Figure 1, in which Alice's mother has offered the activity of hair combing to Alice, as an example. Note that the caregiver does not take just any nonspecific response on the part of the child to be evidence of that the child comprehends and/or intends to participate in the offered activity. Notice that Alice smiles at 2:24:90 and steps toward her mother with her arm extended at 2:27:93. In response to these acts her mother does not transfer the objects with which to

comb hair to Alice, but rather demonstrates hair combing at 2:26:12 and 2:28:70. However, when Alice drops the hat she has been holding as she takes the doll at 2:29:93, her mother holds out the comb to Alice at 2:31:51. Thus, when Alice drops the object, the hat, that had been engaging her attention and displays that she is engaged in hair combing by taking the doll, her mother takes that conduct to be specific to the offered activity. Alice's mother displays her analysis of Alice's conduct by offering the comb to Alice.

Coding of play sequences. First play sequences were differentiated from non-play sequences. Non-play is defined as literal action. The activity is a means to an end. For example, in an interactive sequence a mother gives her child a ball. In this instance, the exchange is a means to transfer the ball from the mother to the child. In a non-interactive sequence a child drops a ball to the floor in order to pick up a doll that engages her/his attention. In this case, dropping the ball is a means to pursue another activity, picking up another object. Play is defined as non-literal action. The activity is an end in itself, a means to act. For example, in an interactive sequence a mother and child toss a ball back and forth. In this case, the exchange is a means to continue interacting, not a means to transfer the ball from one person to the other. In a non-interactive sequence a child drops a ball to the floor and then repeatedly catches and drops the ball. In this case, dropping the ball is a means to continue to act.

Next the play sequences were classified as non-interactive or interactive. Non-interactive play is not guided by the caregiver. Even though the caregiver is talking or is in near proximity, unless the caregiver has a direct effect on the specific activity, the activity was categorized as non-interactive. Obviously, the caregiver has indirect effects on the activity, e.g., allocation of space, configuration of the participants, location, and attention. To count

as noninteractive play the child was engaged in the same action two times, such as shaking some keys twice, or engaged in the action plus at least one variation, such as shaking and dropping or pulling or twisting them. The organization of interactive play has been described by Garvey (1974) and Goldman and Ross (1978) in terms of rounds in which each participant contributes her/his own move or portion. These portions are conditionally relevant, not simply ordered in time. The second portion sequentially implicates the first by displaying this conditional relevance. The second portion may be an imitation of the first (X bangs a block; Y bangs a block), a variation (X bangs a block; Y bangs a stick), or a reciprocal (X offers a block to Y; Y accepts the block from X). In this study two rounds were required for an interaction to be classified as interactive play, since one round may be simply imitation or a means to an end, rather than a means to interact.

Content. To assess the children's performance the content of play sequences was classified in terms of three variables: the degree of cultural knowledge, sensorimotor structure (complexity), and sensorimotor support (presence of the sensorimotor structure on the sensorimotor level). The classification system integrates, modifies, and extends the descriptions of Bates et al. (1979), Garvey (1974), Inhelder, Lezine, Sinclair, and Stambak (1971), Nicolich (1977), Piaget (1962), and Hay, Ross, and Goldman (1979).

First, four levels were employed to reflect the increase in cultural knowledge displayed in play sequences that occur during the one-word period. At first children are engaged in activities that are predominantly focused on (1) non-specific sensory manipulation of the self or objects, e.g., vocalizing or sound play (Keenan, 1977; Weir, 1962), mouthing (Piaget, 1962, p. 162; Inhelder et al., 1971), rubbing. Next children engage in activities that focus on (2) specific manipulation of intrinsic properties of objects, e.g., rolling a

ball, nesting boxes, stacking rings on a tower. Then, children display (3) fragmentary/routinized conventional object use in culturally recognizable activities (CRA-1). The child's actions are poor approximations of a fragment of some common cultural activity. These enactments are often truncated and/or awkward. In a noninteractive sequence Jeremy put a toy telephone receiver on his shoulder rather than to his ear while babbling. In interactive play he may imitate or reciprocate by producing an obligatory movement in a well-practiced routine such as covering his face and saying 'boo' in peek-a-boo. Finally, the child displays (4) improvisational/coherent object use in culturally recognizable activities (CRA-2). In these play sequences the child engages competently in a coherent activity. The child initiates the activity and/or provides variations. For example, in a coherent non-interactive play sequence, the child might put a toy telephone receiver to his/her ear, dial the phone, wait a moment, and begin to 'talk.' In an interactive play sequence Alice's mother suggested that Alice comb her own hair, her mother's, and a baby's (doll's). Each successfully consummated combing sequence counted as a round of play. Alice generalized the activity to yet another doll. Thus, this interactive play sequence was categorized as improvisational/coherent object use in a culturally recognizable activity, since Alice's actions were integrated and she innovated by combing another doll's hair.

Second, to assess the complexity of activities, play sequences were also categorized in terms of the sensorimotor structure of the event, viz, agent, action, object, patient (animate being), location, instrument, and so on (Zukow et al., 1982). Object, location, and instrument were collapsed into one category, inanimate object, due to the difficulty in differentiating object and location, e.g., pointing to something/somewhere in a book (Ninio, 1980, and the infrequent occurrence of instruments (3 out of 295 sequences).

Body parts were categorized as patient since they are parts of animate beings (Greenfield & Smith, 1976; Zukow, 1980). Inanimate objects to which animacy is attributed by at least one coparticipant in the interaction were categorized as patients. That is, a doll that was comforted was considered a patient, whereas a doll that was simply transferred back and forth was considered to be an inanimate object. The interactions were examined in terms of the agent and his/her action with some Object (child touches a ring), with some Patient as a passive experiencer (child touches her/his mother), with two objects (child puts pins on a chair), Object-Object, and with object and patient (child gives her/his mother a ball), Object-Patient. In some interactions patients were active experiencers that were caused to act, Cause-Patient. That is, the child or the caregiver caused a doll to dance or the caregiver glossed the child's acts in this way. Finally, in other interactions the patient was treated as an active agent doing something, Do Patient. For instance, Jeri directed her doll's attention so that it might join Jeri in looking at a picture of an elephant in a book. In the hair combing example (Figure 1), the sensorimotor structure consisted of the agent: Alice; the complex action: the embedded gesture of offering the comb within an enactment of hair combing; the patient: the 'baby' doll with hair; and the instrument: the comb.

Third, the sensorimotor support available during enactment of activities was classified into categories reflecting the presence, absence, or substitution of the elements necessary for the activity enacted. For example, consider the action of combing a baby's hair (Figure 1). In this case, Alice used a comb that was present and substituted an inanimate object resembling a baby, a doll, for the absent baby. Alice or her mother might have acted as if she had a comb or baby in hand or might have over-riden the conventional use of an object by substituting, say, a block or a scrub brush for the comb or a ball for the baby.

Interobserver agreement. Cohen's κ was used to measure interobserver agreement since it removes chance agreement and is the statistic of choice in situations in which there are nominal data and two observers making subjective judgments (Tinsley & Weiss, 1975). Ninety-six sequences were randomly selected for categorization as play vs non-play sequences. Interobserver agreement was 89.4%. Twenty-five percent of the total number of play sequences were rated (72 out of 295). Interobserver agreement was 91.5% for judging interactive vs non-interactive sequences, 91.1% for degree of cultural knowledge, 89.2% for sensorimotor structure, and 88.4% for sensorimotor support.

Results

In this section each level of semantic development will be treated separately. Noninteractive and interactive play sequences are described quantitatively and qualitatively. The qualitative examples highlight the most typical and/or most advanced cultural knowledge, sensorimotor structure, and sensorimotor support.

Level I

Quantitative description. Table 1 shows that the degree of cultural knowledge in noninteractive sequences during Level I is dominated by non-specific sensory manipulation of objects 81% of the time. The remainder of non-interactive sequences include 16% specific manipulation of objects and only 3% culturally recognizable activities-1. In contrast, during interactive sequences the non-specific sensory manipulation of objects is reduced to 41% while specific manipulation of objects increases to 26.5%, culturally recognizable activities-1 to 26.5%, and culturally recognizable activities-2 accounts for 6% of the sequences. The trend toward more advanced displays of cultural knowledge during interactive sequences held for each individual child at each

level as well (Table 2). An analysis of the sensorimotor structure of non-interactive sequences reveals, not surprisingly, that object play accounts for over 80% of all sequences, whereas Figure 2 shows that in interactive sequences objects are the focus of interaction in 60% of the instances of play. Interactive sequences at this level contain patient in 16% of the sequences and patient-object in 21%. In all cases the patient is a passive experiencer, e.g., the recipient of some object or action. With respect to sensorimotor support on only two occasions out of 13 during Level I were substitutions observed. In both cases a toy phone was the object of play rather than a real one.

Insert Tables 1 and 2 and Figure 2 about here

Qualitative descriptions. During Level I noninteractive sequences children most often engaged in non-specific sensory manipulation of objects such as rubbing or mouthing toys. The children spent a far smaller proportion of the sequences manipulating specific, intrinsic properties of cultural objects. For instance, on several occasions Sandy repeatedly pushed or pulled a noise-maker toy back and forth. In the most advanced noninteractive sequence, a culturally recognizable activity-1, Jeremy placed a toy phone on his shoulder while babbling. During interactive sequences non-specific manipulation of self or objects took the form of arousal games, such as tickling and sound play, while specific manipulation was characterized by caregivers introducing variations of some intrinsic property of an object such as stacking various rings on a tower or opening/closing many compartments of a toy. The most advanced interactive sequence at Level I was one in which Sandy's mother engaged her in conventional object use in a culturally recognizable activity-2. Her mother requested that Sandy point to and name the animals

and objects in a book. Sandy could often follow her mother's 'other-regulation' by pointing to named items and by repeating. Sandy, however, spontaneously pointed at only a few items and named even fewer.

Level II

Quantitative descriptions. In noninteractive sequences, the degree of cultural knowledge (Tables 1 and 2) varied from a high of 56% non-specific sensory manipulation to 42% specific manipulation to a low of 2% culturally recognizable activities-1. During interactive sequences the play sequences were represented as follows: 2% non-specific sensory manipulation; 12% specific manipulation; 61% culturally recognizable activities-1; and 25% culturally recognizable activities-2. There is marked shift during interactive play at Level II from non-specific sensory manipulation and specific manipulation to culturally recognizable activities. The sensorimotor structure of the vast majority (80%) of non-interactive sequences continues to involve objects only. During interactive sequences at Level II patient and patient-object sequences continue to account for 1/3 of the interactions (Figure 2). Further, at Level II sequences in which a patient is caused to act make an appearance. An analysis of sensorimotor support reveals that these patients are not animate beings but are inanimate objects, often dolls, substituted for babies.

Qualitative descriptions. In contrast to Level I, Alice at Level II was able to engage in a more integrated culturally recognizable activity-1 all by herself. In her most advanced noninteractive sequence she attempted to 'comb' her dolly's hair with a toy comb, albeit none too competently. Sometimes Alice did manage, perhaps accidentally, to get the teeth of the comb to catch a few strands of hair. During interactive play when Alice and her mother 'combed' heads Alice's movements were more thorough and skillful. Her mother directed Alice to comb most of the available heads: Alice's, Mom-

my's, and a 'baby' doll's. Alice directed herself to comb yet another dolly's head. During the interactive play sequences, since her movements were more competent, complete, complex, and innovative, this sequence was categorized as CRA-2.

Another means for differentiating between Level I and Level II is the treatment of patients. The role of patient during Level II in most interactive sequences, 65%, and a few noninteractive ones involved substituting an inanimate object, a doll, for an animate being. In most sequences involving the animacy of dolls during Level II the caregiver initiates the activity and the child joins in. For example, Alice's mother requested that Alice give the dolly seated next to Alice a drink. Her mother touched her fingers to her thumb as if her hand were a cup and extended the 'cup' toward Alice. Alice touched her hand to her mother's, made a fist, and put her hand to the doll's mother. This might be considered true symbolic behavior, pretending to give the doll a drink, rather than imitation of her mother's actions. However, Alice turned her hand over as she touched her hand to the doll's mouth so that all the imaginary water would have spilled out. Further, when her mother requested that Alice return the cup, Alice cried because she thought that her mother wanted the miniature comb and brush that were clutched in her hands. Alice surely did not understand that the return of an imaginary cup was being requested. During much of the interaction Alice's face was blank, and her movements were awkward and truncated. Thus, at Level II the child can most often engage in cultural activities with appropriate objects (CRA-1) although the child's performance is often fragmentary, less than competent, and not clearly symbolic.

Level III

Quantitative descriptions. The degree of cultural knowledge displayed in

the majority of non-interactive sequences at Level III (Tables 1 and 2) entail non-specific sensory manipulation (62.5) while specific manipulation occurs 12.5% of the time. Culturally recognizable activities-1 account for 19% of the sequences and culturally recognizable activities-2 for 6%. Again a greater proportion of interactive sequences are more advanced than non-interactive ones. That is, 8.5% were categorized as non-specific sensory manipulation, 8.5% as specific manipulation, 37% as culturally recognizable activities-1, and 46% as culturally recognizable activities-2. With respect to sensorimotor structure, at Level III the first episodes appear in which patients are treated as active agents, Patient Do (Figure 2). An analysis of the sensorimotor support reveals that a doll or stuffed animal continues to fulfill the patient role.

Qualitative descriptions. The most advanced noninteractive and interactive sequences were classified as culturally recognizable activities-2 since they were coherent, competently executed episodes in which the child introduced variations quite spontaneously. During Level III interactive sequences continue to be more advanced than noninteractive sequences. For example, in the most advanced noninteractive sequence Jeri picked up a book by herself and began to point to and name many animals. On several occasions she also supplied what the animal 'said,' the onomatopoeia. During one of the most advanced interactive sequences, Jeri and her mother were seated on the bed looking at a picture book. During this interaction Jeri's mother pointed to an elephant in the book and asked, "What's that?" Jerry replied, "ã::::" (Elephant). Jeri picked up her doll and said, "be ɔ::" (Baby. Elephant). Next she looked at the doll, rotated it toward the book while saying, "be bi, ɔ::" (Baby, Elephant). She lifted the doll away from the book, looked at it full-face, and then put the doll at her side. At this point it was not clear if this was spontaneous action or some routine she had learned from her mother.

However, a few moments later her mother exclaimed, "O:::h!!" while looking at a new page. Jeri pointed to the page saying, "o[redacted]." She turned to the doll, attempted to get its attention by tugging on its dress. Next Jeri brought her hand to a position directly above the doll's eyes and paused. Then while looking at the doll, Jeri moved her hand in a trajectory that was led by pointing her index finger directly at the picture in the book. She repeated a variant of her mother's exclamation, "a[redacted]::" to coincide with the point's projected destination in the book. In this fragment the child's gestures to her doll make available to us that she was not engaged in some routine based on past observation. Her ability to interact spontaneously to the dynamic particulars of the situation displayed her skill and sensitivity to just and only those details. The sensorimotor structure of this interactive sequence was categorized as P Do. That is, the child treated the doll as an active agent who looks.

In summary, at each level of semantic development the degree of cultural knowledge in interactive play sequences surpassed that of noninteractive sequences. Further, cultural knowledge steadily increased from level to level. The sensorimotor structure was more complex in interactive sequences at all levels and became more complex at each successive level of semantic development. Sensorimotor support became less tied to the context at Levels II and III when dolls were substituted for animate beings.

Discussion

Evidence from this study strengthens Vygotsky's claims that children gain knowledge of the world through social interaction. Further, these results are consonant with findings of other researchers who have examined the importance of interaction with the caregiver (Carew, 1980; Dunn & Wooding, 1977; Sachs, 1980; Zukow, 1981, 1982, 1983; Zukow et al., 1982) or

observation of models (Fenson, 1981) during the second year of life. Specifically in this study at each of three levels of semantic development children engaged in more advanced play sequences during interaction with the caregiver than in non-interactive sequences. The caregivers 'other-regulated' by providing demonstrations of culturally recognizable activities, guided the children's participation in them, and interpreted ongoing activities as such. At first the children imitated the caregiver and/or produced fragments of well-practiced, highly structured culturally recognizable activities. Later the children were able to 'self-regulate' by participating in the same or similar activities by themselves or were able, within interactive sequences, to supply variations and improvisations.

These primarily cross-sectional data point to the ways in which caregivers may contribute to the social and cognitive development of their children. However, the instructions to the caregivers surely affected the conditions under which the data were collected. Since the play sequences in the present study were selected from videotapes that were recorded during times in which the caregivers predicted that 'talk' was most likely to occur, the data are biased toward interaction. In other studies disparate research objectives emphasized other conditions. Researchers have looked at play in the presence of caregivers who were instructed to go about their normal daily routines at home (Dunn & Wooding, 1977), at play linguistically prompted by researchers who were instructed in the laboratory not to participate actively in the ensuing play (Fein, 1979), at the effect of modelled play on spontaneous play (Fenson, 1981), and at solitary play (Wolf & Gardner, 1979). To confirm the importance of the caregiver, studies are needed that compare solitary play during which the caregiver is not present to play which occurs in interaction with the caregiver.

In contrast to cross-sectional research, longitudinal studies can document whether activities displayed by an individual child first appear in interaction or in solitary activities. For example, it is possible that attributions of animacy to dolls might not arise solely from tuition or demonstrations on the part of the caregiver. The child might generalize from her/his own interactions with nurturant caregivers to her/his own dolls. Further, longitudinal data would also provide a means to examine the effect of the caregiver's modeling on the child. That is, caregivers who model more or less might be expected to have children who display particular conduct more or less. Preliminary results from cross-cultural longitudinal data collected in the U.S. and Mexico suggests that caregivers who rarely model nurturant behavior with dolls have children who rarely exhibit attribution of animacy to dolls (Zukow, 1983). Thus, longitudinal research, as well, is needed to confirm the findings reported in the present study.

McCune-Nicolich (1981) has proposed potential structural parallels between the emergence of play and language, including decentering. Greenfield and Smith (1976) have presented evidence and Loch (1980) has confirmed that the semantic functions children produce first describe events in which the child is engaged and only later those in which others are engaged. Similarly, in Fenson (1980) and in the present study, play activities became decentered. First play was dominated by the child's activities with objects. Later the emphasis gradually shifted to activities which involved others (patients). Although not a structural parallel, the caregiver's role in the emergence of language and play shares correspondences. Zukow et al. (1982) found that caregivers provided the sensorimotor structure of events to help children make the transition from the comprehension of sensorimotor communication to the comprehension of linguistic communication. At each successive level of

semantic development less sensorimotor structure was provided by the caregiver. The child gradually supplied more sensorimotor support in tandem with the child's increasing ability to internally represent events. In the same vein, at first in play sequences the caregiver closely guided the child's performance in culturally recognizable activities (CRA-1). At the end of the one-word period, however, the children could perform with relatively little guidance and could supply variations and improvise (CRA-2). Some of the responsibility for providing the structure within which coparticipants negotiated the meaning of ongoing events subtly shifted from caregiver to child in both domains. These studies provide some additional evidence to support McCune-Nicholich's proposal that there are parallels between the emergence of language and play.

Finally, the effect of social interaction with the caregiver offers a solution to one set of questions raised by Inhelder et al. (1971) only to provide the basis for many more questions that remain unanswered. Inhelder et al. (1971) describe the shift from sensorimotor intelligence to culturally recognizable activities-2 (what they term symbolic conduct), such as attributing animacy to dolls, as mysterious. Sachs (1980) has suggested that demonstrations of such play by caregivers to children may be a factor in its development. The data in this study provide evidence to confirm her speculation. How children may come to treat dolls as animate, given the tuition that the caregivers provided, is no longer quite so mysterious. However, why caregivers begin to treat dolls as animate in the presence of the children at Level II is still unknown. What the child might do that causes the caregiver to begin to model animacy is unresolved. These problems merit further research.

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TABLE 1

Distribution of Non-interactive and Interactive Play Sequences by Content and Level

Level and Type of Interaction	Degree of Cultural Knowledge: Non-specific Sensory Manipulation	Specific Manipulation	Culturally Recognizable Activity-1	Culturally Recognizable Activity-2
I				
Non-interactive	80.7% (46)[a]	15.8% (9)	3.5% (2)	-- --
Interactive	41.2% (14)	26.5% (9)	26.5% (9)	5.9% (2)
II				
Non-interactive	56.1% (37)	42.4% (28)	1.5% (1)	-- --
Interactive	2.3% (2)	11.5% (10)	64.4% (56)	21.8% (19)
III				
Non-interactive	62.5% (10)	12.5% (2)	18.8% (3)	6.2% (1)
Interactive	8.6% (3)	8.6% (3)	37.1% (13)	45.7% (16)

[a]Numbers in parentheses indicate the number of tokens of each type.

TABLE 2

Distribution of Non-Interactive and Interactive Play Sequences by Context and Children at Each Level

Level, Subject and Type of Interaction	Degree of Cultural Knowledge: Non-specific Sensory Manipulation	Specific Manipulation	Culturally Recognizable Activity-1	Culturally Recognizable Activity-2
I				
Jeremy				
Non-interactive	86.2% (25)[a]	10.3% (3)	3.5% (1)	(0)
Interactive	50.0% (4)	(0)	50.0% (4)	(0)
Sandy				
Non-interactive	75.0% (21)	21.4% (6)	3.6% (1)	(0)
Interactive	13.2% (10)	11.8% (9)	72.4% (55)	2.6% (2)
II				
Alice				
Non-interactive	70.8% (17)	29.2% (7)	(0)	
Interactive	1.7% (1)	8.8% (5)	80.7% (46)	8.8% (5)
Jim				
Non-interactive	61.9% (13)	38.1% (8)		
Interactive	5.6% (1)	11.1% (2)	38.9% (7)	44.4% (8)
Lisa				
Non-interactive	33.3% (7)	66.7% (13)		
Interactive		27.3% (3)	18.2% (2)	54.5% (6)
III				
Lisa				
Non-interactive	60.0% (6)	20.0% (2)	20.0% (2)	
Interactive	8.3% (2)	12.5% (3)	37.5% (9)	41.7% (10)
Jeri				
Non-interactive	66.7% (4)		17.7% (1)	17.7% (1)
Interactive	9.1% (1)		36.4% (4)	54.5% (6)

[a]Numbers in parentheses indicate the number of tokens of each type.

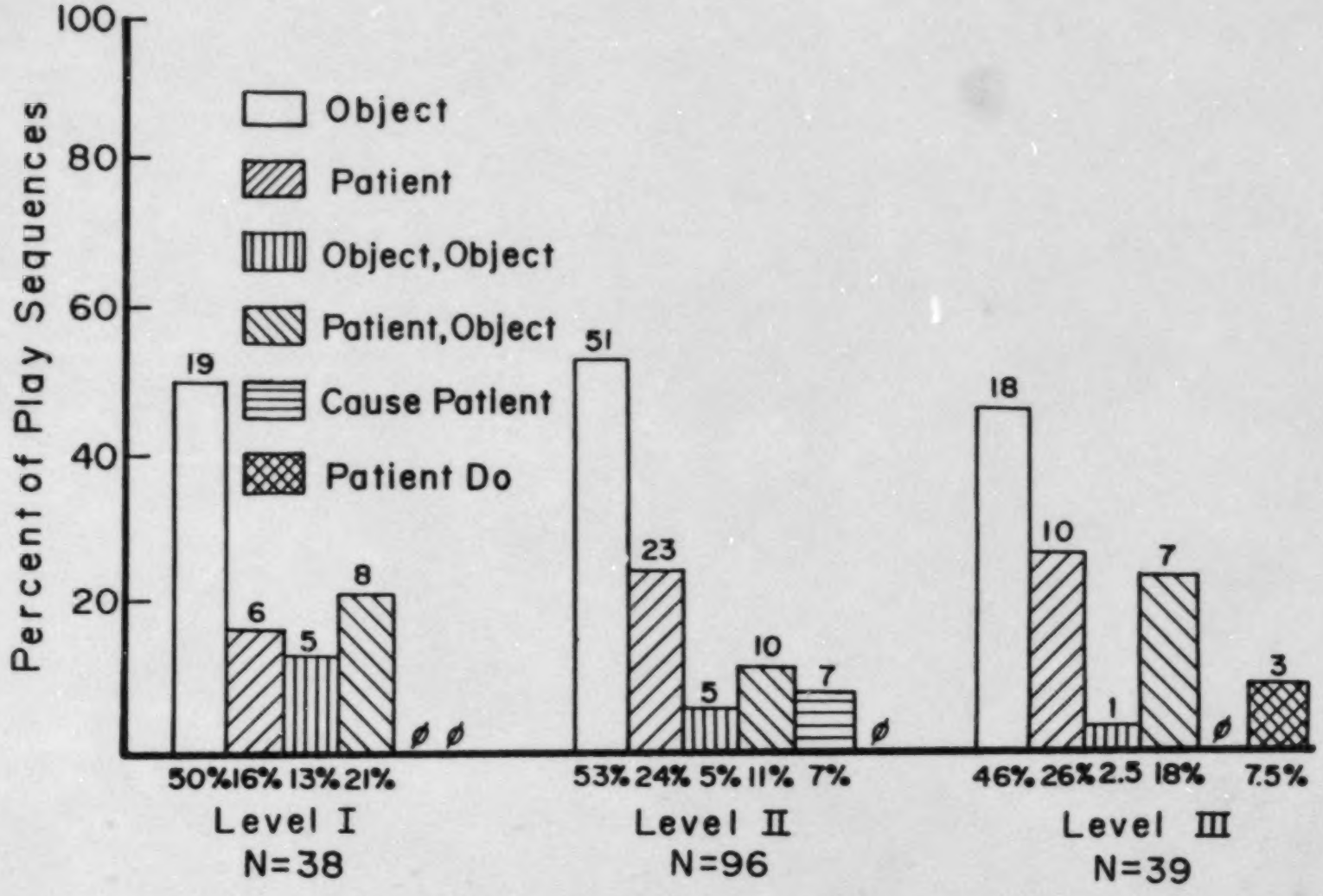
Figure 1. Transcript 1.

Transcript 1.

configuration	TIME min	sec	frac	MOTHER non-verbal	verbal	eye gaze	CHILD eye gaze	verbal	non-verbal
A ∩ □ toy box Living room	2	21	56	seated. holding doll		< A	∇		seated
		22	58				>↓doll		
			90	reaches into toy box counter-clockwise turn		>↓box			
		23	23		(Do ya) wanna comb the baby's hair?/				
			46				>L's hand		stands up holding hat
			90	clockwise turn					
		24	00	holding out doll		<A	>(comb)		
			66		Here's a co:mb/				
			90	arm in box, pulls out comb					smiles
		25	26			∇ comb			
			50						
		26	12	smiling, combs doll's hair			>↓L		
			61		A:::h(m)/				
C ⊃ A L		27	43						
			73			<↑A			
			93						arm extended, steps toward L
		28	70	reaches up comb's A's hair					
			73		Comb A:lice's hair./				
			88						leans forward slightly
	2	29	93						takes doll, drops hat
		30	06						
			16	sits up					
			51	holds out comb					
			70						reaches toward comb
			90	extends hand closer to A					
		31	15		(Here) comb Mommy's hair./				
			23						grasps comb
			40	releases comb			>↓doll		
			80						
			88	drops hand					
		32	30						combs doll's hair

Figure Caption

Figure 2. Distribution of sensorimotor structure in interactive play sequences during the one-word period.


Percent of Play Sequences
100
80
60
40
20
Object
Patient
Object, Object
Patient, Object
Cause Patient
Patient Do
19
6
5
8
51
23
5
10
7
18
10
1
7
3
50% 16% 13% 21%
53% 24% 5% 11% 7%
46% 26% 2.5 18% 7.5%
Level I
N=38
Level II
N=96
Level III
N=39